

# Electrochromic Windows

## What is this Technology?

Electrochromic (EC) windows switch from a clear to dark state with a small applied voltage, and promise to optimize daylighting, visual comfort, and solar heat gains without the need for blinds. Window tinting can be controlled manually (using a button or switch), or by an automated building control system, which programs sensors to respond to changing sunlight levels and heat conditions.

## Why is GSA Interested?

EC windows can potentially reduce both heating and cooling loads, and improve the success of daylighting strategies. This project is a second phase of an assessment begun as part of GPG's FY11 program. It will evaluate a next generation of electrochromic windows at a Land Port of Entry representative of locations where visibility to the outside needs to be maintained at all times and the incumbent technology (blinds) hinders mission performance.



**ENERGY EFFICIENCY** The glazing properties of EC windows can be modified to optimize daylighting and control solar heat gains. Research studies project the potential for a 22% reduction in heating, cooling and lighting energy use.



**COST EFFECTIVENESS** This technology is in an early stage of commercialization. Potential savings are greatest for buildings that can reduce electric lighting power via dimming in response to the presence of natural light.



**OCCUPANT SATISFACTION** Tenant acceptance and satisfaction associated with EC windows' ability to control glare, provide visibility to the outdoors and better control temperature near windows will be evaluated. Additionally, improvements in mission delivery from enhanced visual acuity at all times of day and night will be evaluated at the Land Port of Entry.



**OPERATIONS & MAINTENANCE** This evaluation will validate a key promise of EC windows—their potential to eliminate the need for interior window shades and exterior shading devices—and their associated installation, cleaning and maintenance costs. The impact of coordination with the BAS will also be assessed.



**DEPLOYMENT POTENTIAL** Electrochromic windows have the potential to be more beneficial than static coatings in all climates.

*Adapted from a report by the National Renewable Energy Laboratory. The Green Proving Ground program, in association with a federal laboratory, is subjecting electrochromic windows to real-world measurement and verification in GSA buildings. Findings from that investigation will be available in 2015.*